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The NASA Lightning Nitrogen Oxides Model (LNOM):
Recent Updates & Applications

ABSTRACT: Improvements to the NASA Marshall Space Flight Center Lightning Nitrogen Oxides Model (LNOM) and its application to the Community Multiscale Air Quality (CMAQ) modeling system are presented. The LNOM analyzes Lightning Mapping Array (LMA) and National Lightning Detection Network[TM] (NLDN) data to estimate the raw (i.e., unmixed and otherwise environmentally unmodified) vertical profile of lightning NOx (= NO + NO_2). Lightning channel length distributions and lightning 10-m segment altitude distributions are also provided. In addition to NOx production from lightning return strokes, the LNOM now includes non-return stroke lightning NOx production due to: hot core stepped and dart leaders, stepped leader corona sheath, K-changes, continuing currents, and M-components. The impact of including LNOM-estimates of lightning NOx for an August 2006 run of CMAQ is discussed.